

REMARKS

In the last Office Action, the Examiner rejected claims 5, 6, 14 and 15 under 35 U.S.C. §102(b) as being anticipated by Japanese Patent No. 02304737 to Okada. Claims 1-4, 7-13, 16, 19 and 20 were allowed by the Examiner. Claims 17 and 18 were objected to as being dependent upon a rejected base claim, but indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Additional art was cited of interest.

Applicants and applicants' counsel note with appreciation the indication of allowable subject matter concerning claims 1-4, 7-13 and 16-20. However, for the reasons noted below, applicants respectfully submit that amended claims 5, 6, 14 and 15 also patentably distinguish from the prior art of record.

In accordance with the present response, allowable claims 17 and 18 have been rewritten in independent form to incorporate the subject matter of corresponding base claims 14 and 15, respectively. Claims 5, 6, 14 and 15 have been amended to further patentably distinguish from the prior art of record.

Applicants respectfully request reconsideration of their application in light of the following discussion.

Brief Summary of the Invention

The present invention is directed to an information recording medium.

As described in the specification, in order to reproduce information recorded on an information recording medium using a probe, positioning control means is required to accurately move a microscopic aperture of the probe to an arbitrary position on the information recording medium. In conventional magnetic disk apparatuses, a servo-surface scheme and a sector servo scheme are generally adopted for such position control. In the servo-surface scheme, one of a plurality of disk surfaces is used exclusively for servo control so that a servo magnetic head is positioned relative to the servo surface and the remaining disk surfaces and ~~magnetic heads are used for containing data.~~ In the sector servo scheme, servo information is embedded on selected portions of the data surface for position control. However, as described on pages 5-8 of the specification, it has been difficult to perform accurate position control of the probe utilizing the foregoing servo schemes of the conventional magnetic disk apparatuses.

The present invention overcomes the drawbacks of the conventional art. Figs. 10(a)-10(b) show an embodiment of an information recording medium 60 according to the present invention embodied in the claims. The information recording

medium 60 has a read-out track having a center axis 61 and containing a unit of information 62 to be reproduced by a reproducing probe having a microscopic aperture. The unit of information 62 is comprised of a groove having a depth which increases constantly or gradually in a direction perpendicular to both a length of the read-out track and a depth of the information recording medium 60 for detecting a deviation of the microscopic aperture of the reproducing probe from the center axis of the read-out track during reproduction of the unit of information 62 by the reproducing probe.

In another embodiment shown in Figs. 11(a)-11(b), an information recording medium 70 has a read-out track having a center axis 71 and a groove containing a unit of information 72 to be reproduced by a reproducing probe having a microscopic aperture. The groove is saw tooth-shaped in a section taken in a direction perpendicular to a read-out direction. The unit of information 72 is formed along a slant surface of the saw tooth-shaped groove which is configured to allow detection of a deviation of the microscopic aperture of the reproducing probe from the center axis of the read-out track during reproduction of the unit of information 72 by the reproducing probe.

By the foregoing construction, the grooves and corresponding surface structure of the read-out track of the information recording medium can be effectively used to

provide a tracking control function for controlling a moving direction and amount of the probe by allowing detection of a deviation of the microscopic aperture of the probe from the center axis of the read-out track during reproduction of the unit of information by the probe.

Traversal of Prior Art Rejection

Claims 5, 6, 14 and 15 were rejected under 35 U.S.C. §102(b) as being anticipated by Okada. Applicants respectfully traverse this rejection and submit that amended claims 5, 6, 14 and 15 recite subject matter which is not identically disclosed or described in Okada.

Amended independent claim 5 is directed to an information recording medium and requires a read-out track having a center axis and containing a unit of information to be reproduced by a reproducing probe having a microscopic aperture, the unit of information being comprised of a groove having a depth which increases constantly or gradually in a direction perpendicular to both a length of the read-out track and a depth of the information recording medium for detecting a deviation of the microscopic aperture of the reproducing probe from the center axis of the read-out track during reproduction of the unit of information by the reproducing probe.

Amended independent claim 6 is also directed to an information recording medium and requires a read-out track having a center axis and a groove containing a unit of information to be reproduced by a reproducing probe having a microscopic aperture, the groove being saw tooth-shaped in a section taken in a direction perpendicular to a read-out direction, the unit of information being formed along a slant surface of the saw tooth-shaped groove which is configured to allow detection of a deviation of the microscopic aperture of the reproducing probe from the center axis of the read-out track during reproduction of the unit of information by the reproducing probe.

Amended independent claim 14 is directed to an information recording medium and requires a read-out track having a center axis and units of information to be recorded/reproduced by a probe, the units of information being comprised of grooves disposed asymmetric about the center axis of the read-out track, each of the grooves having a slant surface configured to allow detection of a deviation of the probe from the center axis of the read-out track during recordal/reproduction of the unit of information by the probe.

Amended independent claim 15 is also directed to an information recording medium and requires a read-out track having a center axis, a slant surface, and a unit of information formed along the slant surface, the read-out track

being asymmetric about an axis extending in a direction generally perpendicular to a scanning direction of a probe for recording/reproducing the unit information of the read-out track, the slant surface being configured to allow detection of a deviation of the probe from the center axis of the read-out track during recordal/reproduction of the unit of information by the probe.

Thus each of amended independent claims 5, 6, 14 and 15 requires an information recording medium having a read-out track with a groove having a specific structure (claims 5, 6, 14) or with a slant surface (claim 15) which is configured to allow detection of a deviation of the probe (claims 14, 15) or a microscopic aperture of the probe (claims 5, 6) from the center axis of the read-out track during recordal/reproduction of the unit of information by the probe. No corresponding structural and functional combination is disclosed or described by Okada.

Okada discloses an optical disk with grooves 6 having a sawtooth-like cross-section formed on a substrate 1. Information is recorded on slant or slope surfaces of the grooves for the purpose of increasing the recording density of the optical disk. According to Okada, the width of a slope surface d3 of the sawtooth-like cross-section groove can be made wider than the width of a groove of square cross-section, thereby realizing high density recording (see abstract).

However, Okada does not disclose or describe the tracking control function of the information recording medium recited in each of amended independent claims 5, 6, 14 and 15. More specifically, Okada does not disclose or describe a read-out track having a unit of information comprised of a groove having a depth which increases constantly or gradually in a direction perpendicular to both a length of the read-out track and a depth of the information recording medium for detecting a deviation of the microscopic aperture of the reproducing probe from the center axis of the read-out track during reproduction of the unit of information by the reproducing probe, as recited in amended independent claim 5. Likewise, Okada does not disclose or describe a read-out track having a groove which is saw tooth-shaped in a section taken in a direction perpendicular to a read-out direction, a unit of information formed along a slant surface of the saw tooth-shaped groove, and that the slant surface is configured to allow detection of a deviation of the microscopic aperture of the reproducing probe from the center axis of the read-out track during reproduction of the unit of information by the reproducing probe, as recited in amended independent claim 6.

Furthermore, Okada does not disclose or describe a read-out track having units of information comprised of grooves disposed asymmetric about the center axis of the read-out track, each of the grooves having a slant surface

configured to allow detection of a deviation of the probe from the center axis of the read-out track during recordal/reproduction of the unit of information by the probe, as recited in amended independent claim 14. Likewise, Okada does not disclose or describe a read-out track having a slant surface and unit of information formed along the slant surface, the read-out track being asymmetric about an axis extending in a direction generally perpendicular to a scanning direction of a probe for recording/reproducing the unit information of the read-out track, and the slant surface being configured to allow detection of a deviation of the probe from the center axis of the read-out track during recordal/reproduction of the unit of information by the probe, as recited in amended independent claim 15.

Thus amended claims 5, 6, 14 and 15 patentably distinguish from Okada because in Okada the purpose and function of the sawtooth-like cross-section groove is for increasing the recording density of the optical disk by recording information on the slant or slope surfaces of the grooves, not for providing the specific tracking control function required by each of amended independent claims 5, 6, 14 and 15 as set forth above.

In the absence of the foregoing disclosure recited in amended independent claims 5, 6, 14 and 15, anticipation cannot be found. See, e.g., W.L. Gore & Associates v.

Garlock, Inc., 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984) ("Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration"); Continental Can Co. USA v. Monsanto Co., 20 USPQ2d 1746, 1748 (Fed. Cir. 1991) ("When more than one reference is required to establish unpatentability of the claimed invention anticipation under § 102 can not be found".); Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co., 221 USPQ 481, 485 (Fed. Cir. 1984) (emphasis added) ("Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim").

Stated otherwise, there must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. This standard is clearly not satisfied by Okada for the reasons stated above. Furthermore, Okada does not suggest the claimed subject matter and, therefore, would not have motivated one skilled in the art to modify Okada's optical disk to arrive at the claimed invention.

In view of the foregoing, applicants respectfully request that the rejection of claims 5, 6, 14 and 15 under 35 U.S.C. §102(b) as being anticipated by Okada be withdrawn.

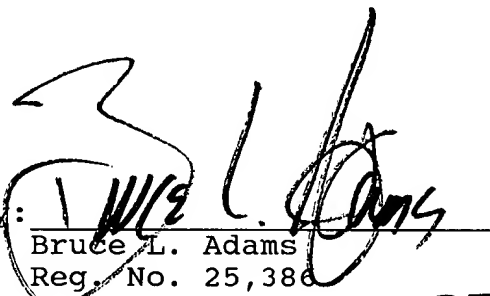


In view of the foregoing amendments and discussion,
the application is believed to be in allowable form.
Accordingly, favorable reconsideration and allowance of the
claims are most respectfully requested.

Respectfully submitted,

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